OTHER CHEMICALS AND CONCERNS

There is a wide range of chemicals that may need to be used in the treatment of swimming pool water apart from disinfectants. The main common named chemicals are:

Soda Ash - (Sodium carbonate) is a strong alkali powder or liquid, which is used to quickly raise the pH of a pool. Soda ash should not be added to a pool by slug dosing but should be added slowly and gradually over an extended period. This is a dangerous chemical and should be handled with care.

Dry Acid - (sodium bisulphate) is a strong acid powder, which may used to quickly reduce pH. Dry acid should not be added to a pool by slug dosing, but should be added slowly and gradually over an extended period. This is a dangerous chemical and should be handled with care.

Muriatic Acid - (hydrochloric acid) is a strong acidic liquid that may also be used to reduce pH quickly particularly when the reserve alkalinity is greater than 120 mg/L. This is a dangerous chemical and should be handled with care.

Carbon Dioxide - (CO_2) is a gas which when added to water forms a weak acid (carbonic acid) and may be used to reduce pH when the reserve alkalinity is less than 120 mg/L. It is best used in an automated pH correction system.

Bicarb - (sodium bicarbonate) is a weak alkali powder, which is used to raise total alkalinity. Slug dosing will not raise the pH to greater than 8.3.

Algaecides - algae are relatively harmless to humans but they may make the pool unsightly, may cause colors, promote bacterial growth, assist in the formation of chloramines and their presence indicates poor pool maintenance. From a safety point of view, algae cause slippery pool walls, pool bottoms and walkways. Algae can be introduced into a pool in the form of airborne spores, blowing free in the air attached to dust or enveloped by raindrops. They are mainly associated with outdoor pools, as they require sunlight to grow.

The most uniformly accepted algal control procedure is to maintain a free chlorine residual of between 1 to 2 mg/L, or where pools are warmer than 80° F, a minimum 3 mg/L concentration. A successful technique for algal control is to frequently superchlorinate the swimming pool to 10 mg/L, particularly after windy conditions and rainfall. The use of a pool cover to prevent contamination and reduce light intensity may also be helpful. There is a range of algaecides available on the market and their compatibility with the disinfectant system should be determined at the point of sale. Algaecides are an adjunct to pool conditioning for winter.

Storage Of Chemicals

Chemicals should be stored separately in well-labeled, dedicated, airtight containers and they should never be allowed to mix. Chlorine based chemicals should never be mixed with acids as the dangerous chlorine gas may be liberated. Oxidizing agents, such as disinfectants, should not be allowed to remain in contact with organic matter as spontaneous combustion may occur. Fires may only be extinguished with copious quantities of water.

The following twelve rules should be observed:

1. Ensure all chemical containers are labeled and follow all instructions implicitly.
2. Store chemicals separately from each other.
3. Store chemicals in a cool, clean, dry, well ventilated, secure area to prevent access by children.
4. Store above ground level to minimize spills, and do not store liquid chemicals above dry chemicals.
5. Wear appropriate protective impervious gloves and goggles when handling chemicals.
6. Wash hands before and after handling chemicals.
7. Avoid contact with chemicals on skin and eyes, and avoid breathing vapors.
8. Use a separate scoop for dispensing each chemical.
9. Always add the chemical to clear, clean water and never add water directly to a chemical.
10. Avoid spillages and clean up any spillage immediately.
11. Remove chemical contaminated clothing immediately.
12. When not in use, keep chemical containers sealed with original closure.
13. Empty containers should be washed before disposal.

Automatic Control And Dosing

Continuous dosing refers to the use of a metering device to feed a chemical at a relatively constant rate. Continuous dosing does not include the use of a floating dispenser containing a dissolving chemical. Automatic control and dosing however, refers to a continuous dosing system activated and controlled by feedback from electronic chemical sensing equipment.

There are two methods of automatic control and dosing of disinfectant. They are by the use of amperometric probes measuring disinfectant residuals or by the use of high-resolution oxidation-reduction potential detection probes (ORP or redox). Automatic control may also be exerted over pH.

The amperometric method is designed to measure free available chlorine. The amperometric method may be also used to measure other disinfectants. The results obtained may be used to automatically adjust feed rates of dosing mechanisms providing a greater degree of control over disinfectant usage and compliance with standards particularly as pool bathing loads change.

Much less is understood by pool operators about the principal of redox measurement, which measures the total disinfecting power of all oxidizing disinfectant forms in the pool water once set to the correct initial oxidation potential. The signal from the redox probe may be used to automatically dose the pool water. The required redox potential for disinfection will vary slightly between disinfecting systems and is also dependent on the basic water supply potential which must be assessed and taken into account when the control system is initialized. Redox potential from 700mV to 750mV are appropriate and are reflected in the chemical criteria.

The installation of automatic control and dosing systems for disinfectant and pH control is strongly recommended.